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Radiological Assessment of Esophageal Malignancies

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Abstract: Contrast barium studies have been accepted as the most radiological technique for diagnosing esophageal cancer. Esophageal cancer is one of the most lethal of all neoplasms. We aimed to evaluate the radiological aspects of patients with esophageal cancers seen at our center. We evaluated 80 patients with cancer of esophagus presenting at radiotherapy department of Imam Khomeini hospital, Tabriz, Iran, between January 2005 and September 2007. The evaluation included radiological aspects, pathological and demographic characteristics patients with esophagus cancer. Location, size, histologic type and cardia involvement of tumors were assessed. Data were analyzed by SPSS software. There were 50 males and 30 females, with a median age of 58.4 years (range 30-90). Among 80 patients diagnosed with esophagal cancer, 72/80 (90%) were included SCC and 8/80 (10%) as adenocarcinoma. 41/80 (51.3%) were located in the lower third esophagus. The most location of tumors was middle third esophagus in females and lower third esophagus in males. Involving cardia observed in 8/8 (100%) of adenocarcinoma. 36.1% of lesions were infiltrative in SCC vs 12.5% in adenocarcinoma. Cardia Vegetation and stagnation were most frequent in adenocarcinoma. This approach suggests that cardia involvment combine with vegetation and stagnation can be useful tool in evaluating esophageal cancers in the lower third esophagus.

Key words: Esophageal cancer, pathology, radiological findings, patients, Tabriz

INTRODUCTION

Esophageal carcinoma exists in two major forms with distinct pathological characteristics, namely squamous cell carcinoma (SCC) and adenocarcinoma (Souza, 2002; Stoner and Gupta, 2001). Esophageal carcinoma is one of the most common malignancies worldwide (Boring *et al*., 1994). Detection and diagnosis of minute esophageal cancers by radiological techniques is difficult (Chen *et al*., 1999).

The aim of this study was to evaluate the radiological aspects of 8o esophageal cancers seen at radiotherapy department of Imam Khomeini Hospital, Tabriz, Iran between January 2005 and September 2007.

MATERIALS AND METHODS

In this study, we retrospectively reviewed the medical records of patients who were diagnosed as esophageal cancer and had both pathological and radiological reports. We evaluated 80 patients with cancer of the esophagus at radiotherapy department of Imam Khomeini Hospital, Tabriz, Iran during January 2005-September 2007. Radiographic studies were reviewed by one specialized body imaging radiologist. Details about patients' demographics and tumor characteristics were collected through review of medical records. Our continuous review of all histopathologic and radiologic reports provided us with further information regarding tumor location, histologic type. The location of the mass within the esophagus was recorded, the upper, middle and lower locations were roughly defined as 21-26, 26-32 and 32-40 cm from the mouth, respectively. The main purpose of present study was to evaluate the radiological findings of esophageal cancers in our center.

RESULTS

Our findings indicated among 80 cases of esophageal cancers, male preponderance was observed (62.5% males vs 37.5% females) and median age was 58.4 years (range 30-90). Histopathologically, squamous cell carcinoma type was 90 and adenocarcinoma 10%, with a male to female ratio 1.6: 1. The most common involved

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Table 1: Characteristics of patients in the current study

Patients characteristics (n=80)	
Gender (M:F,% of male)	50:30 (62.5)
Age (yr, median, range)	58.4 (30-90)
HISTOLOGY (N, %, M:F)	
Squamous cell carcinoma	72 (90, 45:27)
Adenocarcinoma	8 (10, 5:3)
Lesions characteristics	
Size (mm, median, range)	67.5 (20-140)
Location (n, %, M:F)	
Upper third	9 (11.3, 7:2)
Middle third	30 (37.5, 17:13)
Lower third	41 (51.3, 26:15)

Table 2:Comparison between characteristics of tumors

Tumor type	Squamous cell carcinoma	Adenocarcinoma
Gender (M:F, % of male)	45:27 (1.6)	5:3 (1.6)
Age (yr, range)	30-90	45-77
Location (n): Upper/ middle/ lower		
In male	7/ 17/ 21	0/ 0/ 5
In female	2/ 13/ 12	0/ 0/ 3
Cardia involvement (n, M:F)	4, 3:1	8, 5:3
Lesions size (mm, median, M:F)	64.5 (69:60)	70.5 (71:70)
Features of tumors (n, %, M:F)		
Infiltrative	26 (36.1, 13:13)	1 (12.5, 1:0)
Vegetative	46 (63, 32:14)	7 (87.5, 4:3)
Ulcerative	65 (90.3, 42:23)	7 (87.5, 4:3)
Stagnation	5 (6.9, 4:1)	2 (25, 2:0)
Size (mm, mean, M:F)	6.5, 6.9:6	7, 7.1:7

location was the lower third esophagus (51.3%) followed by middle third (37.5%) and upper third esophagus (11.3%). The median lesions size was 67.5 mm (range 20-140 mm). Patients' characteristics are summarized in Table 1.

Among SCC 4 (5.5%) patients had involving cardia visible at imaging and all of these masses were located in the lower third esophagus. Whereas, involving cardia in adenocarcinoma appear in 100% cases. The details of radiologic and pathologic findings are presented in Table 2.

DISCUSSION

Esophageal cancer ranks as the sixth most common malignancy in the world (Thompson, 1997) and it constitutes 7% of cancers in the gastrointestinal cancers (Levine and Halvorsen, 2000). It remains one of the most lethal of all cancers (Levine, 1997). Most patients with esophageal cancer are middle-aged or elderly. In this study range of patients' age with SCC of esophagus was more than adenocarcinoma. The majority of esophageal and gastric cardia cancers are squamous cell carcinomas or adenocarcinomas (Tytgat *et al*., 2004). Squamous cell carcinoma is the most frequent neoplasm of the esophagus and represents 90% of all esophageal cancers (Berlin *et al*., 1995). The results of present study indicate that esophageal squamous cell carcinomas include 72/80 (90%) cancer of esophagus. In China, SCC accounts for more than 90% of esophageal carcinomas (Guo *et al*., 2007). Another research in Italy reports that 55.2% of esophageal tumors are SCC (Roul *et al*., 2007). Previous studies in Dar es Salaam and Korea and Japan showed that the most common esophageal cancers were SCC in 61, 88 and 90% cases, respectively (Mwakyusa *et al*., 1982; Kim *et al*., 2007; Takubo *et al*., 2007).

In 1975, approximately 75% of esophageal cancer cases in the US were SCCs and 25% were adenocarcinomas. In 1988, esophageal SCC outnumbered adenocarcinoma 2: 1 and during the period of 1992-1994, the incidence of esophageal adenocarcinoma overtook SCC in the US by 1.2: 1 (Devesa *et al*., 1998; Pohl and Welch, 2005). Previous studies indicate that adenocarcinoma is more prevalent in western countries (Souza, 2002; Stoner and Gupta, 2001). In Schlansky's report SCC and adenocarcinoma occur in 17 and 81% of cases, respectively (Schlansky *et al*., 2006). Our findings indicate that 8/8 (100%) of esophageal adenocarcinomas occur in the lower third of the esophagus and squamous cell carcinomas localize with frequencies of 9/72 (12.5%), 30/72 (41.6%) and 33/72 (45.8%) in the upper, middle and lower thirds of the esophagus, respectively. Prior reports indicate that the dominant site of esophageal adenocarcinomas is the distal esophagus in 75% of cases, whereas SCC distribute evenly in the middle and distal thirds of the esophagus (Pohl and Welch, 2005). The done research in Dar es Salaam showed that the lower third of the esophagus was the commonest location of tumors, accounting for 63% of the cases, while 61% of all cancers were of the SCC (Mwakyusa *et al*., 1982). Authors observed that location of mass alone can not be as a good marker to distinguish SCC from adenocarcinoma.

Based on findings at radiology, the tumor was found to involve the cardia region in 4/72 (5.5%) of the SCC and 8/8 (100%) of the adenocarcinoma. The total cardia region involvement in our approach was 12/80 (15%). Similar study in Denmark documented that as 70% of the esophageal cancers did not involve the cardia this is consistent with our results (Bytzer *et al*., 1999). Another study in Italy demonstrate that frequency of cardia cancers was 33.9% (Roul *et al*., 2007), this is unlikely to explain our results. It is clear, location of tumors can be as a radiological marker to distinct SCC from adenocarcinoma special in the upper and middle third esophagus. According to the findings of this survey certainly tumors located in upper and middle third of esophagus are SCC. Differencing of tumors localized in the lower third esophagus is difficult. It was not able to different them in the lower third esophagus. In these cases, involving cardia legion can assist as key useful to distinguish SCC

from Adenocarcinoma. Our data showed that in patients with involving cardia 4/12 (33%) of lesions can be SCC and 8/12 (67%) adenocarcinoma.

Double-contrast barium studies have been accepted as the best radiological technique for diagnosing early esophageal cancer. Advanced squamous cell carcinomas may be manifested on barium studies by infiltrating (Fig. 1), polypoid, ulcerating (Fig. 2) and varicoid lesions (Levine and Halvorsen, 2000; Levine, 1997). Radiological findings of infiltrating carcinomas are irregular luminal narrowing ulceration and strictures with abrupt shouldered ends (Fig. 3). Adenocarcinomas have the same radiographic features as SCC on barium studies, such as infiltrating, polypoid, ulcerative, or less commonly, varicoid lesions (Fig. 4). These tend to invade the gastric cardia and fundus, therefore, optimal double-contrast images of the cardia and fundus should be obtained (Kumbasar, 2002). In our survey the vast majority of radiological features were mixed. In 65/72 (90.3%) of SCC were ulcerative, followed by vegetating in 46/72 (63%) and infiltrating in 26/72 (36.1%). Rate of infiltrative SCC in female to male was 1.6: 1.

Totally, SCC can be infiltrative threefolds more than adenocarcinomas (36.1% vs 12.5%).

Among adenocarcinomas 7/8 (87.5%) were vegetative and ulcerative and 1/8 (12.5%) infiltrative.

Infiltrating is most frequent in SCC while vegetating present more in adenocarcinoma. We observed stagnation in 2/8 (25%) of adenocarcinoma and 5/72 (6.9%) of SCC with a ratio 4: 1.

In the authors' experience, presence of stagnating and vegetating in the esophageal cancers mostly predict lesions be adenocarcinoma to SCC. These features can be the key investigations in assessing the esophagus masses.

Our findings did not find correlation between extents of lesions with type of tumors.

Fig. 2: Ulcerative SCC

Fig. 1: Infiltrative SCC

Fig. 3: Advanced SCC

Fig. 4: Adenocarcinoma

CONCLUSION

In the authors' experience, cardia involvement combine with vegetation and stagnation can be the key investigations in patients with locally esophageal cancer of the lower third esophagus.

REFERENCES

Berlin, W.O., H. Levy, D.W. Mapel and J. Manley, 1995. Radiologic case. Right hilar mass. Squamous cell carcinoma of the esophagus with hilar metastasis. West J. Med., 162 (1): 71-72.

Boring, C.C., T.S. Squires, T. Tong and S. Montgomery, 1994. Cancer statistics. CA Cancer J. Clin., 44: 7-26.

Bytzer, P., P.B. Christensen, P. Damkier, P. Vinding and N. Seersholm, 1999. Adenocarcinoma of the esophagus and Barrett's esophagus: A population-based study. Am. J. Gastroenterol., 94 (1): 86-91.

Chen, L.Q., C.Y. Hu, P. Ghadirian and A. Duranceau, 1999. Early detection of esophageal squamous cell carcinoma and its effects on therapy: An overview. Dis. Esophagus., 12 (3): 161-167.

Devesa, S.S., W.J. Blot and J.F. Fraumeni, 1998. Changing patterns in the incidence of esophageal and gastric carcinoma in the United States. Cancer, 15; 83 (10): 2049-2053.

Guo, S.J., D.M. Lin, J. Li, R.Z. Liu, C.X. Zhou, D.M. Wang, W.B. Ma, Y.H. Zhang and S.R. Zhang, 2007. Tumor-associated macrophages and CD3-zeta expression of tumor-infiltrating lymphocytes in human esophageal squamous cell carcinoma. Dis. Esophagus., 20 (2): 107-116.

Kim, J.H., H.S. Chung, Y.H. Youn, S.W. Park, S.Y. Song, J.B. Chung, C.B. Kim and Y.C. Lee, 2007. Treatment outcomes of 70 cases of early esophageal carcinoma: 12 years of experience. Dis. Esophagus., 20 (4): 297-300.

Kumbasar, B., 2002. Carcinoma of esophagus: Radiologic diagnosis and staging. Eur. J. Radiol., 42 (3): 170-80.

Levine, M.S. and R.A. Halvorsen, 2000. Carcinoma of the Esophagus. In: Gore, R.M., M.S. Levine Eds. Textbook of gastrointestinal radiology. Philadelphia: Saunders, W.B., pp: 403-33.

Levine, M.S., 1997. Esophageal cancer. Radiologic diagnosis. Radiol. Clin. North Am., 35 (2): 265-279.

Mwakyusa, D.H., W.M. Dolmans and I.M. Mbaga, 1982. Oesophageal malignancies in Dar es Salaam. Trop. Geogr. Med., 34 (3): 257-260.

Pohl, H. and H.G. Welch, 2005. The role of overdiagnosis and reclassification in the marked increase of sophageal adenocarcinoma incidence. J. Natl. Cancer Inst., 97 (2): 142-146.

Roul, A., G. Portale, C. Castoro, S. Merigliano, F. Cavallin, G. Battaglia, S. Michieletto and E. Ancona, 2007. Management of esophageal cancer in patients aged over 80 years. Eur. J. Cardiothorac. Surg., 32 (3): 445-448.

Schlansky, B., A.J.J.R. Dimarino, D. Loren, A. Infantolino, T. Kowalski and S. Cohen, 2006. A survey of oesophageal cancer: Pathology, stage and clinical presentation. Alimentary Pharmacol. Therapeutics., 23 (5): 587-593.

Souza, R.F., 2002. Molecular and biologic basis of upper gastrointestinal malignancy-esophageal carcinoma. Surg. Oncol. Clin. North Am., 11: 257-272.

Stoner, G.D. and A. Gupta, 2001. Etiology and chemoprevention of esophageal squamous cell carcinoma. Carcinogenesis, 22: 1737-1746.

Takubo, K., J. Aida, M. Sawabe, M. Kurosumi, M. Arima, M. Fujishiro and T. Arai, 2007. Early squamous cell carcinoma of the oesophagus: The Japanese viewpoint. Histopathology, 51 (6): 733-742.

Thompson, W.M., 1997. Esophageal carcinoma. Abdom. Imaging., 22 (2): 138-142.

Tytgat, G.N., H. Bartelink, R. Bernards, G. Giaccone, J.J. Van Lanschot, G.J. Offerhaus and G.J. Peters, 2004. Cancer of the esophagus and gastric cardia: Recent advances. Dis. Esophagus, 17 (1): 10-26.